b. What does x represent in function S? What does x represent in function L? What does the composite function $S(L(x))$ represent? What, if any, real-world meaning does $L(S(x))$ have?

c. Let $f(x) = (S \circ L)(x)$. Sketch a reasonable graph of function f. Label the axes of the graph with the name of the variable represented.

4. *Traffic Problem:* The length of time, $T(x)$, it takes you to travel a mile on the freeway depends on the speed at which you travel. The speed, $S(x)$, depends on the number of other cars on that mile of freeway.

a. Sketch reasonable graphs of functions T and S. Label the axes of each graph with the name of the variable represented.

b. What does x represent in function T? What does x represent in function S? What does the composite function $T(S(x))$ represent? What, if any, real-world meaning does $S(T(x))$ have?

c. Let $g(x) = (T \circ S)(x)$. Sketch a reasonable graph of function g. Label the axes of the graph with the name of the variable represented.

5. *Composite Function Graphically, Problem 1:* Functions h and p are defined by the graphs in Figure 1-4j, in the domains shown.

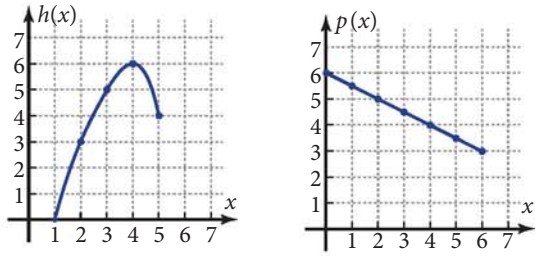

Figure 1-4j

a. Find $h(3)$. On a copy of the graphs, draw arrows to show how you found this value.

b. Use the output of $h(3)$ to find $p(h(3))$. Draw arrows to show how you found this value.

c. Find $p(h(2))$ and $p(h(5))$ by first finding $h(2)$ and $h(5)$ and then using these values as inputs for function p.

d. Find $h(p(2))$ by first finding $p(2)$ and then using the result as the input for function h. Draw arrows to show how you found this value. Show that $h(p(2)) \neq p(h(2))$.

e. Explain why there is no value of $h(p(0))$, even though there is a value of $p(0)$.

6. *Composite Function Graphically, Problem 2:* Functions f and g are defined by the graphs in Figure 1-4k, in the domains shown.

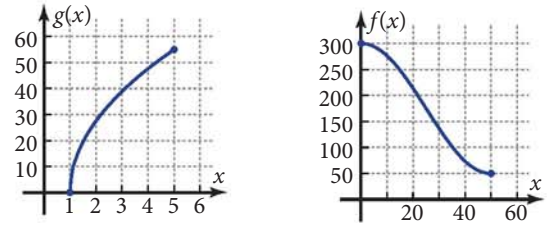

Figure 1-4k

a. Find the approximate value of $g(4)$. On a copy of the graphs, show how you found this value.

b. Use the output of $g(4)$ to find the approximate value of $f(g(4))$. Draw arrows to show how you found this value.

c. Find approximate values of $f(g(3))$ and $f(g(2))$ by first finding $g(3)$ and $g(2)$ and then using these values as inputs for function f.

d. Explain why there is no value of $f(g(6))$.

e. Try to find $f(g(5))$ by first finding $g(5)$ and then using the result as the input for function f. Draw arrows to illustrate why there is *no* value of $f(g(5))$.

7. *Composite Function Numerically, Problem 1:* Functions f and g consist of the discrete points in the table, and only these points. Find the values of the composite functions, or explain why no such value exists.

x	$f(x)$	$g(x)$
1	3	2
2	5	3
3	4	7
4	2	5
5	1	4